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Amyloidosis in Waterfowl

Amyloidosis is a disease characterized by deposits of amyloid, a waxy translucent substance, in tissue. The term amyloid means starch like, referring to its color reaction with iodine. More recent and sophisticated procedures have shown amyloid to be a protein like substance containing fragments of immunoglobulins and nonimmunoglobulin protein. This suggests that the disease process involves the immune system in some unknown manner. While no definite infectious agent or chronic antigenic stimulus has proved to be the cause, various observers have implicated aging (time at risk), infection, maladaptation, social and environmental stress, and genetic predisposition as factors contributing to its production.

Amyloid infiltration usually persists for the life of the individual. The seriousness of the infiltration depends upon the amount of amyloid present and its location. The depositing of amyloid protein in and the massive replacement of the liver and other abdominal organs of the bird is a gradual process that eventually leads to the death of the affected bird. The condition is not contagious.

Signs

Amyloidosis is usually detected when the bird is examined after death or slaughter and then commonly in the presence of chronic infectious diseases. Older, but not necessarily the oldest, birds are affected. Grouped waterfowl have a higher incidence than paired or isolated birds. If signs are seen at all before death they may involve the feet and legs. These may be weak, swollen (edematous), contractured, or infected. The abdomen may be swollen and breathing distressed.

Control

There are no specific measures to be taken against amyloidosis. Although amyloidosis may be associated with various chronic diseases like tuberculosis, aspergillosis, ill defined kidney disorders, cirrhosis, hepatitis, and perihepatitis, the disease may occur in their absence. Nevertheless, it is prudent to take measures against these diseases. The only consistent association with amyloid disease is increasing population density. The inability of the bird to adapt to its surroundings may be one of the most important if not the fundamental cause of the disease. It has been suggested that social and environmental conditions can be constructed to which no waterfowl can satisfactorily adapt and that caging alone can in time produce the disease.

Whatever the fact

Whatever the factors influencing susceptibility, they are found in the bird itself and, in light of present understanding, housing of the birds appears to be of prime importance. Space allotment apparently is of less importance than the number of birds in a space of any given size. Stressful environment associated with damp floors and severe weather changes seem more important. For the waterfowl exhibitor this could mean separating the "gentle" species from the others and not buying birds at an age that equals that of their life expectancy.

Post-mortem Findings

Amyloid is present in various organs, most commonly in the liver and spleen. The liver may be enlarged and firm and yellowish brown or gray brown to pale in color. The spleen also may be firm and enlarged and sometimes ruptured. Extensive deposits of amyloid may lead to ascites, resulting in a straw colored fluid and occasionally blood tinged fluid in the abdominal cavity and possibly in some air sacs. Amyloid may also be seen in the kidneys, ovaries, and thyroid and adrenal glands.

Diagnosis

Frequently a gross presumptive diagnosis of hepatic amyloidosis can be made on the bases of the increased size of liver, its firmness and yellowish brown color, and ascites. At other times a microscopic examination is necessary. Means other than conventional histologic examination now make it possible to differentiate amyloid from other hyalin like eosinophilic substances in minimal amounts. Amyloid deposits in varying amounts have been reported in the liver, spleen, pancreas, kidney, thyroid gland, intestine, striated muscle, brain, adrenal glands, heart, lungs, oviduct, ureters, and proventriculus by the use of fluorescence and the electron microscope, in addition to conventional histologic examination. Further, it has been suggested that the blood parameters of whole blood glucose, serum uric acid, calcium, magnesium, sodium, glutamate-oxaloacetate, and alkaline phosphatase may be of some advantage in screening white Pekin ducks for incipient amyloidosis.

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